



# TEST REPORT

FCC / ISED SAR Exclusion Report for WR23GA  
Certification

APPLICANT  
LG Electronics Inc.

REPORT NO.  
HCT-SR-2302-FI001-R1

DATE OF ISSUE  
March 09, 2023

Technical Manager  
Yun Jeang Heo

(signature)

Accredited by KOLAS, Republic of KOREA

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Test for WR23GA

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Applicant **LG Electronics Inc.**  
222, LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, 451-713, Korea

EUT Type  
Model Name Simple Remote  
WR23GA

FCC ID  
ISED ID BEJWR23GA  
2703H-WR23GA

Max. RF Output Power 4 dBm (EIRP)

Modulation type GFSK

FCC Classification Digital Transmission System(DTS)

FCC Rule Part(s) 47CFR §2.1093

ISED Rule Part(s) RSS-102 Issue 5; Health Canada Safety Code 6

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.

This test results were applied only to the test methods required by the standard.

## REVISION HISTORY

The revision history for this test report is shown in table.

| Revision No. | Date of Issue     | Description          |
|--------------|-------------------|----------------------|
| 0            | February 14, 2023 | Initial Release      |
| 1            | March 09, 2023    | Revised Manufacturer |

### Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC / ISED Rules under normal use and maintenance.

This laboratory is not accredited for the test results marked \*.

The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 AND KOLAS (Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

If this report is required to confirmation of authenticity, please contact to [www.hct.co.kr](http://www.hct.co.kr)



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## 1. EUT DESCRIPTION

|                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Model Name                                    | WR23GA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| EUT Type                                      | Simple Remote                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Power Supply                                  | DC 3.0 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Frequency Range                               | 2 402 MHz – 2 480 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Max. RF Output Power (EIRP)                   | 4 dBm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Modulation Type                               | GFSK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Bluetooth Version                             | 4.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Number of Channels                            | 40 Channels                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Antenna Specification                         | Antenna type: PCB Antenna<br>Peak Gain : 2.72 dBi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| PMN (Product Marketing Number)                | Simple Remote                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| HVIN (Hardware Version Identification Number) | WR23GA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| FVIN (Firmware Version Identification Number) | 1.0.552.8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| HMN (Host Marketing Name)                     | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| EUT serial numbers                            | Radiated: #1-3<br>Conducted: #1-4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Manufacturer                                  | <p><b>1. Hansung Electronics CO.,LTD.</b></p> <ul style="list-style-type: none"> <li>· 49-29, Cheomdangieop 4-ro, Sandong-myeon, Gumi-si, Gyeongsangbuk-do, Korea</li> <li>· Jl. Rotan 1 Blok F27 No.37 A Kawasan Industri Lippo Cikarang, Desa Cicau, Kec. Cikarang Pusat, Bekasi, Jawa Barat, Indonesia 17530</li> </ul> <p><b>2. OHSUNG Electronics CO.,LTD.</b></p> <ul style="list-style-type: none"> <li>· No.188 Tunpu South Road, Qiushe Economic Development Zone, Tongli Town, Wujiang City, Jiangsu Province</li> <li>· Jl. Selayar Blok D7 Kawasan Industri MM 2100, Mekarwangi, Cikarang Barat 17845 Jawa Barat, Indonesia</li> </ul> |

## 2. TEST METHODOLOGY

### 2.1 FCC

Limb SAR and Face SAR Test Exclusions Applied \_Bluetooth 4.2 LE

Since this product is a remote control product, it is used by most users in the hand, so Limb SAR standard is applied. In addition, since this product is capable of voice recognition by the user, an exception evaluation is applied at a distance of 10 mm from the face SAR (head SAR).

According to the FCC KDB 447498 D01 v06 section 4.3.1, for 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

a) For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$  for 1-g SAR, and  $\leq 7.5$  for 10-g extremity SAR, where

$$\frac{\text{Max Power of Channel(mW)}}{\text{Test Separation Distance (mm)}} * \sqrt{\text{Frequency(GHz)}} \leq 3.0 \text{ For 1g SAR, } 7.5. \text{ for 10g SAR}$$

where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

Calculation Result:

Tx frequency range: 2 402 MHz ~ 2 480 MHz

Limb SAR Consideration Min. test separation distance: 5 mm

Face SAR Consideration Min. test separation distance: 10 mm

Maximum Output Power: 3 mW

The Highest RF channel frequency: 2 480 MHz

#### For Face SAR Exclusion

| Mode             | Frequency | Maximum Allowed Power | Separation Distance | ≤ 3.0<br>for 1 g SAR |
|------------------|-----------|-----------------------|---------------------|----------------------|
|                  | [MHz]     | [mW]                  | [mm]                |                      |
| Bluetooth 4.2 LE | 2 480     | 3.0                   | 10                  | 0.5                  |

#### For Limb SAR exclusion

| Mode             | Frequency | Maximum Allowed Power | Separation Distance | ≤ 7.5<br>for 10 g SAR |
|------------------|-----------|-----------------------|---------------------|-----------------------|
|                  | [MHz]     | [mW]                  | [mm]                |                       |
| Bluetooth 4.2 LE | 2 480     | 3.0                   | 5                   | 0.9                   |

Based on the maximum output power of Bluetooth 4.2 LE and antenna to use separation distance, Bluetooth 4.2 LE Limb SAR and Face SAR were not required.

\*Note: "SAR Exemption threshold was calculated with worst case EIRP which is more conservative than conducted power."

## 2.2 ISED

SAR Test Exclusions Applied \_Bluetooth 4.2 LE

Per RSS102 Issue 5, 2.5.1 Exemption Limits for Routine Evaluation

**Table 1: SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance<sup>4,5</sup>**

| Frequency (MHz) | Exemption Limits (mW)           |                                 |                                 |                                 |                                 |
|-----------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
|                 | At separation distance of ≤5 mm | At separation distance of 10 mm | At separation distance of 15 mm | At separation distance of 20 mm | At separation distance of 25 mm |
| ≤300            | 71 mW                           | 101 mW                          | 132 mW                          | 162 mW                          | 193 mW                          |
| 450             | 52 mW                           | 70 mW                           | 88 mW                           | 106 mW                          | 123 mW                          |
| 835             | 17 mW                           | 30 mW                           | 42 mW                           | 55 mW                           | 67 mW                           |
| 1900            | 7 mW                            | 10 mW                           | 18 mW                           | 34 mW                           | 60 mW                           |
| 2450            | 4 mW                            | 7 mW                            | 15 mW                           | 30 mW                           | 52 mW                           |
| 3500            | 2 mW                            | 6 mW                            | 16 mW                           | 32 mW                           | 55 mW                           |
| 5800            | 1 mW                            | 6 mW                            | 15 mW                           | 27 mW                           | 41 mW                           |

| Frequency (MHz) | Exemption Limits (mW)           |                                 |                                 |                                 |                                  |
|-----------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|----------------------------------|
|                 | At separation distance of 30 mm | At separation distance of 35 mm | At separation distance of 40 mm | At separation distance of 45 mm | At separation distance of ≥50 mm |
| ≤300            | 223 mW                          | 254 mW                          | 284 mW                          | 315 mW                          | 345 mW                           |
| 450             | 141 mW                          | 159 mW                          | 177 mW                          | 195 mW                          | 213 mW                           |
| 835             | 80 mW                           | 92 mW                           | 105 mW                          | 117 mW                          | 130 mW                           |
| 1900            | 99 mW                           | 153 mW                          | 225 mW                          | 316 mW                          | 431 mW                           |
| 2450            | 83 mW                           | 123 mW                          | 173 mW                          | 235 mW                          | 309 mW                           |
| 3500            | 86 mW                           | 124 mW                          | 170 mW                          | 225 mW                          | 290 mW                           |
| 5800            | 56 mW                           | 71 mW                           | 85 mW                           | 97 mW                           | 106 mW                           |

For Limb-worn SAR Exclusion: 4 mW x 2.5 = 10 mW

For Face SAR Exclusion: 7 mW

**Calculation Result:**

Tx frequency range: 2 402 MHz ~ 2 480 MHz

Limb SAR Consideration Min. test separation distance: 5 mm

Face SAR Consideration Min. test separation distance: 10 mm

Maximum Output Power: 4 dBm (3 mW) (EIRP)

The Highest RF channel frequency: 2 480 MHz

The SAR exemption from RSS102: Issue 5 was also exempted by the above exclusion conditions.

\*Note: "SAR Exemption threshold was calculated with worst case EIRP which is more conservative than conducted power."